

STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION BUREAU OF CORRECTIVE ACTIONS

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Jim Gibbons, Governor

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July 1, 2008

Mr. Alexander Robertson, IV
Robertson Vick LLP
880 Hampshire Road, Suite B
Westlake Village, CA 91361

Mr. Jan Greben
Greben & Associates
1332 Anacapa St., Suite 110
Santa Barbara, CA 93101

Subject: Responses to May 7, 2008 Letter from the Offices of Robertson Vick, LLP

Facility: Al Phillips the Cleaner (former)
3661 S. Maryland Pkwy
Las Vegas, NV
NDEP ID: **H-000086**

Dear Messrs. Robertson and Greben:

This letter is provided by the Nevada Division of Environmental Protection (NDEP) in response to your letter dated May 7, 2008. Your letter was submitted on behalf of your clients, whom you describe as "homeowners who own residences affected by the Maryland Square PCE Plume." Overall, the letter contained significant mischaracterizations and misinterpretations of NDEP decisions and actions related to the Site, and we address each of those points specifically in the attachment to this letter. NDEP expects that you will share this complete correspondence with all of your clients, although we are not certain at this point whether they received and reviewed a copy of your May 7, 2008 correspondence and the May 12, 2008 errata you provided, since they were not included on the cc list of either letter. Therefore we are placing your letter and our response on the NDEP Maryland Square PCE website.

As an initial matter, the NDEP is very concerned about any perception among the community that there has been a "lack of transparency" or "lack of community involvement in this process." The NDEP implemented a specific plan to involve each and every resident or property owner in the neighborhood, so they could individually engage in a dialogue with NDEP. The NDEP contacted residents in August 2007 with individual letters, and again in September 2007 with placement of flyers at homes that did not respond to our August 2007 letter. You did not raise these concerns during our meeting with NDEP and the State Attorney General's office on March 21, 2008. The NDEP has gone above and beyond suggestions in EPA CERCLA and RCRA community involvement guidelines by offering individual in-home meetings to explain the situation and answer any question in detail. Because the NDEP is aware of the reasonable



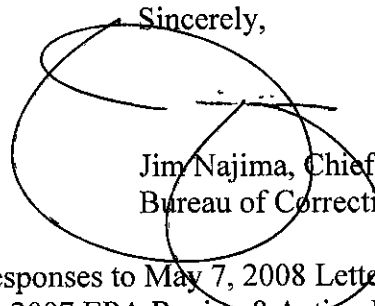
expectation of privacy among residents regarding the potential for harmful levels of a substance within someone's home, we have deliberately planned, executed and maintained a strong presence and availability for the residents on an individual, one-on-one basis.

The NDEP has also kept local state and county elected officials, the Clark County Manager's office, Clark County Unified School District officials, the community liaison for this area at the Clark County Commissioner's office, and Southern Nevada Health District updated on case progress. We have also established a point of contact within the NDEP to check the call-in line on at least a daily basis, and a practice of calling back to speak with the residents by the next business day. With the exception of your letter and one other minor concern addressed in Section 2.5 of the attachment below, the NDEP has not received any complaints or concerns about lack of outreach or involvement from any residents or local agencies or elected officials.

In closing, NDEP advises you that our collective time would be better spent and the community would be better served if we focused on developing and implementing workable solutions to the situation. The emphasis from your correspondence is on exaggerating uncertainty and attempting to find fault without providing constructive suggestions, effectively working at cross purposes with NDEP efforts to make progress on this case. This stance is contrary to the representations you made during the meeting in our offices on March 21, 2008. At that meeting you stated that you intended to work cooperatively with NDEP on behalf of your clients. NDEP is open to considering your constructive suggestions to help address community concerns and effectively manage the release in a health-protective and timely manner.

If you have any technical questions regarding this letter, please contact Greg Lovato at 775-687-9373. Please address any legal questions to William J. Frey at 775-684-1229.

Sincerely,



Jim Najima, Chief
Bureau of Corrective Actions

Enclosures: Detailed Responses to May 7, 2008 Letter
October 12, 2007 EPA Region 8 Action Memo for the Billings PCE Site

cc: (w/ Enclosures)
Wayne Nastri, Regional Administrator, US EPA Region 9, 75 Hawthorne St., San Francisco, CA 94105
Susan Muza, ATSDR Region 9, 75 Hawthorne St. (Suite 100, M/S: HHS-1), San Francisco, CA 94105
Glenn Savage, Southern Nevada Health District, P.O. Box 3902, Las Vegas, NV 89127
William Frey, State of Nevada, Office of the Attorney General, 100 N. Carson Street, Carson City, NV 89701
Dante Pistone, Public Information Officer, NDEP
Greg Lovato, Supervisor, Remediation and Certification Branch, NDEP
Mary Siders, Environmental Scientist, Remediation Branch, NDEP

Attachment to NDEP July 1, 2008 Letter
Detailed Responses to May 7, 2008 Letter

NDEP staff has performed an initial review and response to the May 7, 2008 letter and included our responses to specific points below. Lack of an NDEP response on other statements within the May 7, 2008 letter shall not be interpreted as NDEP agreement or consent with such statements. NDEP may amend or update these responses as new information or analysis becomes available.

1.0 Background

On Page 4, 2nd paragraph your letter states that “...concentrations of PCE were higher closer to the ground surface indicating a potential source of PCE is present above the groundwater.”

There is no evidence to support the presence of a source of PCE in the soil above groundwater within the area in the east parking lot of the Boulevard Mall or within the neighborhood. There are a variety of other, more likely, causes for higher concentrations of PCE in soil gas at shallower depths at any one location. These include, but are not limited to layers of varying permeability with depth and intersection of preferential pathways (utility corridors) at shallower depths.

On Page 4, last paragraph, the RV letter states that, “*The concentration of dissolved PCE in the groundwater collected from the study area has ranged from 350 micrograms per liter (µg/L) to 5,300 µg/L.*”

The statement is incorrect and, when stated within the context of the preceding text describing presence of the groundwater contamination in the neighborhood, intentionally misleading. The historical range of PCE concentrations has extended from nondetect (<1 µg/L) to 5,310 µg/L, with the highest detection measured in a May 2005 sample collected from the western parking lot of the mall and less than 800 feet from the source area. The highest concentration ever measured in a monitoring well in the vicinity of the neighborhood was 2,400 µg/L in MW-18 (December, 2005).

Concentrations reported for first quarter, 2008 groundwater samples range from nondetect (<1.0 µg/L) to 2,500 µg/L, with the highest concentration again in well MW-13 in the western parking lot of the mall. Concentrations for groundwater samples collected from wells in the neighborhood showed PCE concentrations ranging from nondetect (<1 µg/L) to 1,800 µg/L for first quarter, 2008.

2.0 NDEP Spring 2008 Update

2.1 Background Levels of PCE in Indoor Air

On Pp. 5-6, your letter states “*In the Spring Update, NDEP stated that most of the homes with detections of PCE in indoor air ‘were within the range of background as defined by several national studies’. NDEP informed the public that concentrations of PCE in indoor air ‘generally range from 1 to 10 µg/m3 of air, but seldom above 10 µg/m3.’ The*

source(s) of these 'several national studies' on background concentrations of PCE in indoor air were not provided in NDEP's Spring Update."

The Information Update was intended as an informative and accessible document for the lay public, not a technical paper with all references listed. That said, there are numerous recent documents that support the NDEP's position. The Information Update for residents was an informative, non-technical document written for non-scientists, so it was generalized and did not contain all the technical details that are available in other NDEP documents and Maryland Square PCE website links. The goal of the Information Update was to communicate, in an easy to understand document, the situation regarding indoor air concentrations.

It is true that over the past 20 years analytical methods have steadily improved and have lowered the detection limits for most chemicals. However, the most recent download from USEPA's Vapor Intrusion Database (located at www.iavi.rti.org and last accessed on March 6, 2008) and Table 4a of the Draft March 2008 U.S. EPA Vapor Intrusion Database: Preliminary Evaluation of Attenuation Factors (located at <http://www.iavi.rti.org/OtherDocuments.cfm> and last accessed on May 21, 2008) provide supporting statistics for chemical concentrations in background indoor air. Note that the 95th percentile for PCE is 7.5 $\mu\text{g}/\text{m}^3$.

Additionally, the New York State Department of Health (NYSDOH), in their 2006 Vapor Intrusion Guidance (located at http://www.health.state.ny.us/environmental/investigations/soil_gas/svi_guidance/docs/svi_appendc.pdf), listed several tables for background concentrations of chemicals in indoor air, ranging from summary statistics for the USEPA 1988 database, to statistics from NYSDOH (1997), USEPA (2001) and the Health Effects Institute (2005). As can be seen from the tables provided, mean values for PCE in indoor air range from 0.56 to 6 $\mu\text{g}/\text{m}^3$; the 95th percentiles for PCE in indoor air range from 3.17 to 25.4 $\mu\text{g}/\text{m}^3$.

2.2 Results of Recent Indoor Air Testing

On pg. 7, Section 2.2, 1st paragraph your letter states that "*statements by NDEP to homeowners were grossly misleading, and failed to advise them if PCE vapors existed in their homes above the PRG of 0.32 $\mu\text{g}/\text{m}^3$ established by EPA Region IX.*"

NDEP has tried to communicate in an open manner with residents without unnecessarily divulging their personal indoor air sample results. You may not agree with the characterization of 15 out of 97 samples collected as "a few" but this is a difference of perspective as opposed to being "grossly misleading."

Although NDEP is not required to follow the EPA Vapor Intrusion Guidance (EPA VIG) at the Maryland Square Site, it is entirely consistent with the EPA VIG to consider screening a site for short-term mitigation or abatement based on a 10^{-4} risk level, as opposed to the 10^{-6} level used to develop the ambient air Preliminary Remediation Goal (PRG). Indeed tables are provided in the EPA VIG to screen sites from further

consideration or evaluation based on 10^{-4} risk level for long-term risks. The EPA VIG does recommend use of a 10^{-5} risk level for Environmental Indicator Determinations at RCRA Corrective Action Sites and sites being addressed under CERCLA (see p. 9 of the EPA VIG). However, this is for purposes of making an internal EPA Government Performance and Results Act determination, not for determining whether a mitigation system should be installed at a site, the purpose for which NDEP is using the data. As stated on p. 10 of the EPA VIG, "this draft guidance is not designated to be used during the process for determining whether, and to what extent, cleanup action is warranted at these [RCRA and NPL] sites." As stated on pg. 3 of the EPA Technical Background Document for EPA Region IX PRGs, "Chemical concentrations above these levels would not automatically designate a site as "dirty" or trigger a response action."

NDEP also notes that selection of a 10^{-4} risk level for short-term mitigation is consistent with: 1) the evaluation criteria that warrant time-critical and non-time critical removal actions as provided for in the National Contingency Plan (see 40 CFR 300.415, which contains a set of narrative factors and not a specific risk level); 2) the decision made by EPA Region 8 at the Billings, MT PCE site (see attached Action Memo prepared by Region 8 Superfund removal program) to determine whether the vapor intrusion pathway is complete; and 3) the guidance provided on pg. 29 of the Cal/EPA Department of Toxic Substances Control 2005 Interim Final Vapor Intrusion Guidance, among other states listed in Section 2.3.1 below.

NDEP has not made a determination on a final cleanup level for indoor air at Maryland Square PCE site at this time. NDEP has only targeted specific homes for short-term mitigation of indoor air concentrations above the 10^{-4} risk level. NDEP is in the process of evaluating cleanup options for groundwater. NDEP will determine target cleanup levels for groundwater that will ultimately be protective of indoor air at the time a cleanup option for groundwater is selected.

On Page 7, Section 2.2, last paragraph your letter states, "*Given that the USEPA does not recommend the use of indoor air sampling to quantitatively evaluate indoor air risks from subsurface vapor intrusion, we are very concerned that NDEP is inappropriately relying on the single indoor air sample to determine whether conditions exist in a home which warrant taking actions to protect public health.*"

In order for NDEP to properly respond, please provide the specific guidance, section and context under which USEPA has made this recommendation, and how it relates to the specific use of indoor air sample results to make a short-term mitigation decision at the Maryland Square PCE Site. Regardless, it is incorrect to state that NDEP is "relying on a single indoor air sample to determine whether conditions exist in a home which warrant taking actions to protect public health." Rather, NDEP is using the data to determine whether short-term mitigation is warranted for individual homes. In order to determine an appropriate corrective action plan to address the presence of PCE in groundwater, and consequently potential effects from that groundwater on human health, NDEP will be considering the entire dataset for the site.

2.2.1 Reliability of Data

On pg. 8, Section 2.2.1, 1st paragraph, your letter quotes an ITRC guidance document by stating that “*published studies ‘on temporal variability in indoor air quality shows concentrations with a range of a factor of 2–5 for 24-hour samples’*” (ITRC 2007).

This is an out of context quote of a guidance document. While the ITRC has developed a very useful document, each statement or recommendation included in the document needs to be evaluated in the context of the site-specific situation and literature the ITRC document was based upon.

The Las Vegas area has much different climactic conditions compared to sites which are included in the studies referenced in the ITRC document. This is particularly important when the studies exhibited seasonal variation in indoor air concentrations. The lack of a long indoor heating season, very limited if any winter snows, and associated lack of long-term saturated soils is likely to result in less variability in indoor air concentrations in Las Vegas than in homes presented in these studies. NDEP is interested in evaluating any site-specific reasons you believe the situation in Las Vegas is likely to result in seasonal variations in indoor air concentrations as found at sites in the referenced studies.

NDEP also notes that data for indoor air samples collected by the NDEP during September and October 2007 are consistent with the data for samples collected in March 2008.

On page, Section 2.2.1, 2nd paragraph, the letter states “*NDEP has advised the community that only homes containing concentrations greater than NDEP’s self determined ‘action level’ need mitigation systems installed*” and that “*we recommend that NDEP base conclusions regarding the threat to human health posed by indoor air vapors on the measurement of PCE in soil gas following appropriate USEPA guidance.*”

The NDEP has reviewed the universe of literature and guidance on vapor intrusion investigations and carefully evaluated site-specific characteristics of the site. As recommended by the USEPA and the ITRC, multiple lines of evidence were used to evaluate the vapor intrusion pathway at the Maryland Square PCE Site. Before collecting samples of indoor air, NDEP scientists evaluated data for soil gas samples collected in the neighborhood. Using the maximum detected concentration in the neighborhood of 46,000 $\mu\text{g}/\text{m}^3$ as input into the EPA version of the Johnson-Ettinger model, NDEP scientists calculated a conservative estimate of 111 $\mu\text{g}/\text{m}^3$ for PCE in indoor air. The maximum detected concentration of PCE in indoor air during the study was 110 $\mu\text{g}/\text{m}^3$, corroborating use of the J-E model with site-specific geotechnical data collected during the March 2007 soil gas study.

Based on the J-E model result of 111 $\mu\text{g}/\text{m}^3$ in indoor air, the NDEP moved forward with the offer of indoor air sampling to a total of 170 home owners. The fact that the J-E model predicted so well the concentrations observed in indoor air supports the methods that the NDEP has applied throughout this investigation. Additionally, the lack of wide variability in sample results between Phase I sampling (September-October, 2007) and Phase II sampling (February-March, 2008) supports the NDEP's use of one indoor air sample to screen the site for short-term remedial action.

The NDEP notes that there is no "one accepted protocol" for conducting vapor intrusion investigations, and that states have significant latitude in how best to pursue such investigations in a manner that they believe is best suited for the geographic region and the specifics of each site. NDEP's protocol at this site is entirely consistent with the EPA VIG.

2.3 NDEP's Health-Protective Level for PCE in Indoor Air

On page 9, Section 2.3, your letter states that *"It is our understanding that the USEPA has traditionally set the cleanup standards for releases of PCE at levels 100 times lower than those referenced by the NDEP."*

As stated in section 2.2 above, it is consistent with EPA evaluation and the National Contingency Plan to base a decision for short-term mitigation on the 10^{-4} risk level. NDEP refers you to the EPA Region 9 *User's Guide and Background Technical Document for US EPA Region 9's PRG Table* document for the methodology and supporting bases for development of the ambient air PRG at the 10^{-6} level.

Your understanding of how USEPA sets remedial action objectives (including concentrations for final cleanup levels) is not correct and is not really relevant to how NDEP has selected a short-term mitigation level. EPA does select concentrations for carcinogens at the 10^{-6} risk level as an initial point of departure for developing final cleanup levels (see 40 CFR 300.430(e)(2)(i)(A)(2)). However, final cleanup levels selected by USEPA are eventually determined in a site-specific (or operable unit) Record of Decision, may vary from the 10^{-6} risk level after consideration of all other criteria and site specific situation, and higher risk levels may be accepted.

On Page 9, Section 2.3, last paragraph your letter states that it is "interesting" that *"NDEP relied upon USEPA's PRG for PCE concentrations in residential soil samples, and yet NDEP has chosen to ignore the PRG for ambient air established by USEPA in the very same publication NDEP cited to DCI in that letter."*

The October 9 letter provided a variety of "interim remediation goals" so that different remediation costs associated with different volumes of PCE-contaminated source soil could be estimated during the source-area soils assessment. Various concentrations proposed by NDEP for evaluation of source-area soils included 100 $\mu\text{g}/\text{kg}$, 480 $\mu\text{g}/\text{kg}$, and 1,300 $\mu\text{g}/\text{kg}$, and the NDEP noted that the USEPA's soil concentration value for

migration to groundwater was presented as a range of concentrations (3 to 60 µg/kg). These values were being used for a completely different purpose, and that was to set interim remediation goals for a specific corrective action plan that could be re-evaluated after considering additional rounds of groundwater monitoring data and prior to setting remediation goals.

2.3.1 Lack of Nevada Statutory Basis for Indoor Air Action Levels

On page 10, Section 2.3.1, 1st paragraph, your letter states “... *we find no basis in either Nevada or federal law that supports selection of the 1 in 10,000 excess cancer risk as the “action level.”*”

NDEP interprets the statutory language at NRS 459.755 broadly and to include latitude for NDEP to use its expertise in determining when interim mitigation activities are required to address a potential threat to human health, including releases that pose a potential threat via the indoor air inhalation pathway. Note also that NAC 445A.22695 requires owners or operators to take immediate action to mitigate and abate imminent hazards caused by releases. NRS 459.755, using the same condition language (“imminent and substantial hazard”) as NAC 445A.22695, provides NDEP the authority to take action where the responsible person has not acted promptly. Neither of these sections in Nevada statute or regulation limit nor prescribe NDEP’s ability to take short-term action based on a set of potential long-term carcinogenic risk criteria, and should not be interpreted so narrowly.

Please note that use of the term “action level” in the Spring 2008 Update was used as we determined this language was more understandable to the public than “short-term indoor air mitigation level” or other such terms. Use of the term “action level” should not be confused with the definition of that term at NAC 445A.22605, 445A.2272, 445A.22735, which strictly refer to soil and groundwater action levels.

On page 10, Section 2.3.1, 2nd paragraph, your letter states “[i]f NDEP is to follow the NCP, it should follow USEPA’s guidance on establishing preliminary remediation goals for protection of public health.”

While NDEP is not relying upon the NCP for authority in this case, we contend that our actions and proposed decision to mitigate homes that currently contain PCE concentrations in indoor air above the 10⁻⁴ risk level are not inconsistent with the NCP. Once again, this section of your letter confuses criteria used for making decisions about remedial actions (which are covered under 40 CFR 300.430) with those criteria used for making decision about removal actions (which are covered at 40 CFR 300.415).

As stated in section 2.2 above, NDEP finds that our decision for homes that require short-term mitigation twith concentrations in indoor air above the 30

ug/m³ is consistent with: 1) the narrative criteria for removal actions provided at 40 CFR 300.415; and 2) written guidance for short-term vapor intrusion mitigation provided by the states of California, Colorado, Indiana, Michigan, New Jersey, New York, and Wisconsin.

NDEP also reviewed available Public Health Assessments created by Agency for Toxic Substances and Disease Registry (ATSDR) and state health departments where a pathway of concern was vapor intrusion into indoor air due to the presence of PCE in soil or groundwater. NDEP's decision to require short-term mitigation at this site based on a 10⁻⁴ risk level also appears to be consistent with the recommendations and actions taken at these sites. Because several of the Public Health Assessments did not provide a complete data set for each site, NDEP was unable to confirm the criteria used in each of these studies. However, where sufficient data was provided, NDEP was able to determine that a 10⁻⁴ risk level for making a short-term mitigation decision is consistent with the criteria used for recommending short-term mitigation in these studies.

2.3.2 Inappropriate Use of OSHA Standard

On page 11, Section 2.3.2, 2nd paragraph, your letter states *"We are concerned that NDEP is implying that detections of PCE in indoor air above the PRG established by the USEPA are not harmful, and that the residents should be comparing the reported concentrations to the OSHA standard."*

Your statement includes a general misunderstanding of the derivation and use of PRGs. PRGs are not set at levels such that if a concentration is above the PRG it is considered "harmful." NDEP would like to see in writing your references and basis for the implication that any concentration above the 10⁻⁶ cancer risk level is considered "harmful." NDEP can find no statement by EPA or National Research Council that concentrations at the 1.0 x 10⁻⁴ cancer risk level are considered "harmful." PRGs are initially set at the 10⁻⁶ cancer risk level, the most protective end of the risk range, for purposes of developing a final remedy at a site. PRGs are not used by EPA for making decisions about time-critical or non time-critical removal actions or mitigation actions.

The NDEP created the "concentration thermometer" to help laypersons put the concentrations of PCE in context of concentrations that may be encountered in the urban environment or within workplaces. It is not a misrepresentation to show the range of PCE concentrations as related to various health-based standards. In the text accompanying the figure, the NDEP explained how the USEPA derives its health-based standards for residential exposure (24 hours per day for 30 years). If any residents had additional questions about the NDEP's health-protective level of 30 µg/m³ or how it relates to the other exposure scenarios, the NDEP is only a phone call or e-mail away.

2.3.3 Timeframe for Exposures

On page 12, Section 2.3.3, 3rd paragraph, your letter states *“Given these detections, it appears likely that PCE may be present as a DNAPL beneath the Site and downgradient neighborhood.”* On page 13, Section 2.3.3, 1st paragraph, your letter states *“...it would appear appropriate for NDEP to be more circumspect in providing representations to the public as to how fast they would expect to see cleanup of the groundwater occur, especially to the extent that the PCE is present as a DNAPL.”*

Neither your letter nor available literature provides any credible explanation of a physical mechanism that would cause the transport of separate phase PCE from the alleged source site to the downgradient neighborhood. The EPA DNAPL Site Characterization document needs to be used within the context of available site-specific information. The presence of concentrations in groundwater exceeding one percent of the aqueous solubility of PCE does not indicate that DNAPL is present within the vicinity of the monitoring well, it merely indicates that a DNAPL source may be present somewhere on the site.

Cleanup times for downgradient dissolved phase portions of plumes in relatively transmissive hydrostratigraphic units with low organic carbon content (such as the Maryland Square site) are not expected to persist for “centuries,” as implied by your letter. In the downgradient portion of the site, we expect the cleanup times will be dictated by aquifer hydraulics and, depending on the remedy selected, aquifer geochemistry. These limitations are expected to have a much less severe impact on cleanup times as compared to the DNAPL dissolution and adsorption phenomena present within and immediately downgradient of the source zone. Our initial estimate of 5 to 10 years, once a remediation system is implemented, for a significant reduction in groundwater concentrations within the neighborhood is based on simple calculations of groundwater seepage velocity and is not unrealistic.

Several subsurface soil assessments and groundwater sampling events were conducted in the source area from August 2000 through March 2004. Data from five shallow borings (2002) showed PCE concentrations as much as 15,000 µg/kg in site soil, but found no DNAPL. In 2005, seven additional borings to 15 feet bgs were drilled at the source area, and no DNAPL was found. Concentrations ranged from nondetect to a maximum of 120,000 µg/kg. In 2007, data were reported for 17 additional on-site soil borings (depths to about 17 feet bgs), but there were no encounters with DNAPL. No DNAPL has been intercepted in any of the on-site or off-site borings.

2.4 NDEP Plans for Mitigation Systems

On Page 12, Section 2.4, 1st paragraph, your letter states that *“NDEP has indicated that the ‘recommended technology’ to address the intrusion of PCE to indoor air is the use of*

subslab depressurization (SSD) systems. However, it is our understanding that the USEPA recommends soil vapor extraction (SVE) "as the presumptive remedy for sites where volatile organic compounds (VOCs) are present in soil and treatment is warranted."

SVE is typically used for remediation of *source area soils* where PCE is present in the soil. However, this is not a presumptive remedy for PCE in soil gas emanating from contaminated groundwater and 2,000 to 3,000 feet downgradient from the contaminated source-area soils.

The NDEP has been quite clear that it is pursuing home mitigation as a short-term mitigation measure, while also evaluating long-term remedies for the cleanup of groundwater. In this instance, again, you continue to repeatedly and inappropriately cite USEPA and ITRC guidance, to make it *appear* that the NDEP is not following accepted guidance or is not making technically defensible decisions. It is correct that removing and/or destroying the toxic compounds is the best way to prevent contaminant vapors from entering the homes. This is precisely why the NDEP is evaluating remedial options for cleaning up the groundwater as the long-term remedy for the site. The NDEP has not ruled out other options as part of a long-term remedy.

On page 14, Section 2.4, 1st paragraph, your letter states that *"It is our understanding that the design, installation and operation of the SSD systems require expertise and experience to avoid creating adverse conditions for the residents. Our review of the limited information provided to the community regarding the SSD systems has prompted many questions, which should be answered prior to installation of the SSD systems."*

The NDEP has called all residents who are eligible for installation of SSD systems, to answer their questions about these systems and, in the near future, to set up an in-home meeting and home walkthrough evaluation with an experienced certified SSD system installer. The NDEP has been told by two of your clients that you had told them not to talk with the NDEP and not to allow the NDEP to install these systems because the SSD systems may "make things worse." Worse than misleading, these recommendations to homeowners appear both reckless and counterproductive.

SSD systems have a very long track record of providing improved indoor air quality in virtually every case. The NDEP requests the basis for your statement that such systems, properly designed, would create adverse conditions. Please provide specific references and supporting data that document cases where a properly designed system installed by an experienced contractor actually "made things worse" and how the conditions of those cases relate to the specific home construction and HVAC systems present in the Paradise Palms neighborhood.

The NDEP has spoken with experienced staff from the EPA and other state agencies who have addressed the issue of vapor intrusion mitigation. None of these contacts were aware of a properly designed and installed system that "made the problem worse."

The NDEP has reviewed the qualifications of four contractors who are experienced with the design and installation of SSD systems. We have selected a contractor and are in the process of entering into a contract for design and installation of SSD systems. In the immediate future, the NDEP will be calling homeowners and scheduling in-home meetings and walk-throughs with the selected contractor and NDEP staff prior to conducting diagnostic testing on a representative selection of the 15 homes. The contractor will be designing systems for each home and homeowners will be given a copy of the design.

2.4.1 Design of the Sub-Slab Depressurization Systems

All the issues raised in this section of your letter will be addressed after the walk-through and diagnostic testing phases are completed. All proposed designs will be shared with the homeowner and the system will only be installed with written consent of the homeowner.

2.4.1.1 SSD System Vapor Emissions

On page 15, Section 2.4.1.1, 2nd paragraph, your letter includes the following questions and statements: *“How many pounds of PCE vapor can be emitted safely?” “Is a discharge permit required for the SSD system?” “These questions need to be answered prior to installation and operation of the SSD systems to make sure conditions are not made worse by the NDEP’s proposed remedy.”*

Clark County Air Quality Regulation Section 0 lists all de minimis levels for all pollutants. Pursuant to Section 0, the de minimis level for permitting requirements for PCE in and of itself is one ton (i.e., 2,000 pounds, annually). Discharge of PCE will not increase levels of PCE in the neighborhood beyond the amount currently degassing from the groundwater. The SSD system is not a high-vacuum extraction system (i.e., not like an SVE system), it is a small fan that draws the emitted vapors from under the subslab (thereby preventing these vapors from entering the home) and vents the vapors to the atmosphere, where they quickly disperse and degrade.

2.4.2 Installation of the SSD Systems

All the issues raised in this section of your letter will be addressed after the walk-through and diagnostic testing phases are completed. All proposed designs will be shared with the homeowner and the system will only be installed with written consent of the homeowner.

2.4.3 Monitoring of the SSD Systems

All the issues raised in this section of your letter will be addressed after the walk-through and diagnostic testing phases are completed. All proposed designs will be shared with the homeowner and the system will only be installed with written consent of the homeowner.

2.4.4 Cost Recovery for Installation of the SSD Systems

On page 17, Section 2.4.4, 3rd paragraph, your letter stated that *"It is our understanding that NRS 459.775 only allow for expenditures of state funds to address conditions that present 'an imminent and substantial hazard to human health, public safety, any property or the environment. This would appear to be at odds with representations made by NDEP to the public that there is 'no immediate health concern for residents.'"*

Regarding the questions related to NDEP authority for cost recovery, you are correct that NRS 459.755 allows expenditures of state funds to address conditions that present an imminent and substantial hazard to human health, public safety, any property or the environment. However, it is a misinterpretation to characterize the authority to be limited to acute hazard emergency situations (e.g. presence of flammable compounds in vapor form at levels approaching the lower explosive limit, presence of concentrations in air immediately dangerous to life and health) as opposed to situations that present a potential future hazard. Comparable authority used by the EPA at RCRA Section 7003 (See p. 10 of Guidance of Use of Section 7003 of RCRA at: <http://www.epa.gov/Compliance/resources/policies/cleanup/rcra/971020.pdf>) and supporting court decisions recognize that the use of "imminent" is a legal term, and is more properly understood as follows: "[a]n endangerment is 'imminent' if the present conditions indicate that there may be a 'future risk to health or the environment even though the harm may not be realized for years. It is not necessary for the endangerment to be immediate or tantamount to an emergency."

2.5 Public Participation

Since August, 2007, the NDEP has had an active website, which includes the entire administrative record for the Maryland Square PCE Site. Also since August 2007, the NDEP has operated a dedicated resident call-in line for Maryland Square residents, and NDEP representatives have checked the line at least daily (work days), and have carefully and completely documented all call-ins on the NDEP's call-tracking spreadsheet.

Other than your letter of May 7, 2008, the NDEP has only received one statement about lack of outreach or community involvement. That statement came from your client and lead plaintiff, Mr. Peter Voggenthaler, who wrote Clark County Commissioner Chris Giunchigliani in an e-mail dated Thursday, February 14, 2008. After providing indoor air results for his home to Mr. Voggenthaler by letter dated November 28, 2007, NDEP called Mr. Voggenthaler on December 6, 2007 and offered to meet with Mr. Voggenthaler in person. Mr. Voggenthaler did not choose to schedule an appointment.

Among several incorrect or unsupported statements in the February 14 e-mail, Mr. Voggenthaler, stated that: "no one can give us answers", "my neighbors have called and asked about these systems....and no responses or at best vague answers with no conclusions." It is unfortunate that Mr. Voggenthaler did not provide any specific instances of anyone at the NDEP not providing him or his neighbors specific information in response to a request or question, and yet also declined to meet with the NDEP in person after his results were provided.

On page 19, Section 2.5, 1st paragraph you letter states that your "*clients uniformly complain that their messages left on NDEP's 'dedicated resident call-in line for the Maryland Square PCE site go unanswered by NDEP.'*"

NDEP staff have checked the resident call-in line for messages at least once every work day since August, 2007, and the NDEP has maintained a database, recording each call, including noting every day when there were no calls. NDEP staff repeatedly check the line to make sure it is working, which it is.

Please find out what number your clients are calling. The number for the resident call-in line has been listed on all correspondence, and the *Information Update* recently sent to residents (702) 486-0975. The call-in number is also listed on NDEP's Maryland Square website, <http://www.ndep.nv.gov/pce/>, which also provides the e-mail addresses and direct line phone numbers of the NDEP staff working on the project.

3.0 Summary

NDEP has reviewed and responded to a number of requests for further information, clarification, misstatements and mischaracterizations included in your letter above. This section of your letter is merely a re-statement of these same positions and NDEP refers the reader to the sections above for our responses.



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8**

**1595 Wynkoop STREET
DENVER, CO 80202-1129
Phone 800-227-8917
<http://www.epa.gov/region08>**

Ref: 8EPR-ER

ACTION MEMORANDUM

SUBJECT: Request for a Time Critical Removal Approval at the Billings PCE Site, Billings, Montana, Yellowstone County, Montana.

FROM: Kerry Guy, On-Scene Coordinator
Emergency Response Team

THROUGH: Steven Way, Acting Supervisor
Emergency Response Unit

TO: David A. Ostrander, Program Director
Preparedness, Assessment & Emergency Response

Site ID#: 08ME

Category of Removal: Fund Lead, Time Critical

I. Purpose

The purpose of this ACTION MEMORANDUM is to request and document approval of the Removal Action described herein for the Billings PCE Site (the Site), located in Billings, Montana (see Figure 1). In addition, this document shall serve as the request and documentation of approval of a 12-month and \$2 million exemption from statutory limits for the proposed Removal Action. The conditions at this Site meet the emergency criteria for exemption from the statutory limits on a Removal Action.

This Removal Action addresses the need to mitigate the threats to the local population and the environment posed by chlorinated solvent contamination at the Site. The chlorinated solvent tetrachloroethylene¹ (PCE) is the main contaminant of concern and is believed to have been released to the environment from historical dry cleaning operations.

¹ Synonyms for tetrachloroethylene commonly used include tetrachloroethene, perchloroethylene, perc, and PCE. The most familiar term for tetrachloroethylene is PCE, which will be used hereafter in this document to refer to tetrachloroethylene

Conditions existing at the Site present a threat to public health or welfare or the environment and meet the criteria for initiating a Removal Action under 40 CFR Section 300.415(b)(2) of the National Contingency Plan (NCP).

II. Site Conditions and Background

A. Site Description

The Billings PCE Site consists of a PCE groundwater plume extending from 715 Central Avenue (source area) east-northeast through a residential neighborhood and into downtown Billings (see Figure 1). The source of the groundwater plume is likely the result of historic releases of PCE from a dry cleaning operation at 715 Central Avenue. The groundwater plume (defined by the 100ug/l PCE isopleth) reaches a width of 1,000 feet and length of 8,000 feet (see Figure 2). There are 298 residential, 8 condominium, and 179 commercial properties overlying the groundwater plume.

1. Removal Site Evaluation

The Montana Department of Environmental Quality (MDEQ) completed a Preliminary assessment (PA) of the Site from 1992-1993. The Preliminary Assessment (PA) findings were "no further action" based on lack of drinking water usage of the affected aquifer". Subsequent field investigations were conducted by the MDEQ in 1994. MDEQ conducted a CERCLA Site Investigation (SI) in 1999 and 2001. The MDEQ SI revealed an east-northeast trending groundwater contaminant plume and potential indoor air contamination associated with the groundwater contamination.

From July 2006 to present, EPA Region 8 Emergency Response has been conducting a removal site assessment to evaluate the health risks posed by vapor intrusion into indoor air pathway from contaminated groundwater (subsurface vapor intrusion to overlying structures) at the Site. To develop the study area potentially impacted by PCE vapors and evaluate potential remedial actions, the Billings PCE Site groundwater plume and source area were characterized. Results of the removal site assessment up to June 2007 are provided in the Summary Sample Results Report, Billings PCE Site, dated August 29, 2007.

The EPA groundwater investigation included the installation of 60 new groundwater monitoring wells by the START3 contractor with the EPA Geoprobe, the installation of 5 groundwater monitoring wells by a subcontractor, and the identification of 30 existing wells in the site area which could be sampled.

Analytical results from the above groundwater monitoring wells were used to map the contaminant plume and determine the plume boundaries. Core samples were also

collected during the well installations to examine the lithologies. The wells were also used to measure groundwater levels for preparation of water table contours. Figure 2 shows the groundwater plume boundary as defined by the 100ug/l PCE isopleth. The aerial extent of the plume within the 100ug/l isopleth is approximately 140 acres. The highest concentrations of PCE were measured in samples collected from wells down gradient and adjacent to Big Sky Linen. Wells up gradient of Big Sky Linen only had trace concentrations or were non-detect for PCE.

Figure 3 shows the source area investigation conducted along a drain pipe (which services the northeast floor drain in 715 Central) between 715 Central Avenue and 711 Central Avenue and along the city storm drain in front of 711 Central Avenue. The source area investigation utilized several methods to identify PCE sources in the unsaturated and saturated zone and included core samples, groundwater well installations, a membrane interface probe investigation (MIP), and a soil gas investigation.

A membrane interface probe (MIP) investigation was conducted by Columbia Technologies in July 2007 (MIP). The MIP probes uses a heater element on the probe to volatilize and mobilize contaminants, which then pass through the probe's membrane and into a carrier gas for analyses on the surface. The MIP system is used for real-time collection and monitoring of soil gas to identify zones and depth intervals of VOC contamination in the subsurface. The MIP survey was conducted east of and adjacent to 715 Central Avenue, and adjacent to the storm sewer located under Central Avenue (see Figure 3). A total of 24 locations were sampled with the MIP probe, with most MIP pushes going to bedrock.

Data collected during the MIP investigation revealed that the highest VOC contamination is under and adjacent to the drain pipe that connects the northeast floor drain in 715 Central Avenue to the city storm sewer. A liquid sample collected from underneath the pipe had a PCE concentration of 316 ppm, indicating the presence of free-product. The contaminated interval is from approximately six feet bgs (below the drain pipe) to 16 feet bgs (at the fine grained sand/gravel contact). The contamination appears to diminish below the gravel contact where it is apparently dispersed due to the high groundwater velocity. The approximate 15 to 16 foot contaminated interval is below the water table in the fine grained sand. The data also indicated that the PCE released from the pipe primarily migrated down and did not migrate far from the pipe laterally.

A soil gas survey was also conducted in July 2007. The survey was conducted along the city storm sewer and in the same general location as the MIP survey (see Figure 3). The soil gas survey was conducted by START3 with the Geoprobe. The Hapsite field portable GC/MS was used to analyze the samples. The soil gas survey along Central Avenue revealed that the highest PCE concentrations were near the junction

of the 715 Central Avenue drain pile and the city storm sewer. The concentrations decreased downstream (east) of the junction.

To assess the vapor intrusion to indoor air pathway from groundwater, four rounds of sampling for VOCs in and under indoor spaces were conducted: Summer 2006, Fall 2006, Winter 2006-2007, and Spring 2007. Figure 4 presents the locations and results of the indoor air investigation. Table I provides sub-slab and indoor air sample results for the sampled properties. These samples were primarily taken within the delineated area of groundwater contamination ($> 100\text{ug/l}$), though a few samples were collected adjacent to the plume. Of the over 400 buildings (including residences and commercial) overlying the plume, approximately 45 (or 10%) have been sampled. Elevated levels of VOCs were found in both sub-slab samples and indoor air samples. Concentrations of PCE in indoor air range from below detection (1ug/m^3) to 170ug/m^3 . Of the residences sampled, approximately 10% (four residences: 620 St. Johns Ave., 632 St. Johns Ave., 311 Howard Ave., and 342 Miles Ave.) have measured indoor air concentrations that exceed EPA's target indoor air concentration of 41ug/m^3 for PCE in residential settings. The other residences sampled have PCE concentrations substantially below EPA's target level. The commercial building at 711 Central Avenue has measured PCE indoor air concentrations ranging from 42 to 130ug/m^3 , but these values do not exceed EPA's target level of 208ug/m^3 for commercial settings.

Analyses of the relationship between indoor air and sub-slab or groundwater concentrations were used to estimate the area likely to be impacted by vapor intrusion. These analyses suggest that groundwater concentrations above 100ug/L , especially where sands and gravels underlie the buildings, and sub-slab concentrations above $10,000\text{ug/m}^3$ may lead to indoor air concentrations above EPA's target level of 41ug/m^3 for PCE in residences. There are 298 residential, 8 condominium, and 179 commercial properties overlying groundwater concentrations above 100ug/L .

The EPA/Emergency Response Team (ERT) and Response Engineering and Analytical Contract (REAC) developed a flow and contaminant transport model of the site to simulate various groundwater remediation alternatives. The software MODFLOW_rev 4.2 was used to construct the flow model and the software package MT3D was used to construct the contaminant transport model. The groundwater flow model simulates steady-state flow in 50,600 acres of the Billings Basin, and encompasses the 140-acre groundwater plume.

Groundwater flow and contaminant transport simulations were completed for ambient conditions. Model results show that if contamination from the source area is stopped through removal actions (i.e. excavation/treatment/containment), then plume concentrations of less than 100ug/l could be reached within 5 years. Model results show that addition of a treatment zone in the plume (for example a zero valent iron or

bioremediation treatment zone) approximately 4,000 feet from the source, would reduce downgradient concentrations of PCE to under 100ug/l within half this time (Note: the predicted time frames by the model are estimates, and are based on the input parameters of the model to simulate aquifer conditions).

2. Physical Location

Figure 1 depicts the Billings PCE Site in Billings, Montana. The Site includes the PCE source areas, groundwater plume, and overlying properties potentially impacted by vapor intrusion. The Site consists of an identified PCE source area located approximately on and adjacent to the 715 Central Avenue property (see Figure 3), possibly extending onto the 711 Central Avenue property to the east; a groundwater plume to the east-northeast encompassing 140 acres, currently defined by the 100ug/l isopleths and having a width of 1,000 feet and length of 8,000 feet (see Figure 2).

3. Site Characteristics

The map unit that underlies the Site is specified by the Montana Bureau of Mines and Geology (MBMG) as Alluvial Terrace Gravel 2, referring to its location on the second terrace in the Yellowstone River valley. The surficial aquifer is primarily comprised of Pleistocene alluvial material that was observed to be about 28 to 32 feet thick during the investigation. The aquifer overlies shale bedrock that is reported by the MBMG to be greater than 250 feet thick. Core samples collected during the investigation revealed nine to sixteen feet of finer-grained silt, sand, and clay overlying sandy gravel and silty-sandy gravel. The depth to groundwater is approximately 12 to 14 feet. Groundwater flows east-northeast in the site area.

The observed PCE source area contamination lies below a 6 inch drain pipe on the east side of the 715 Central Avenue connecting to the city storm sewer line along Central Avenue (see Figure 3). The drain pipe exits from the northeast section of the 715 Central Avenue building, extends past the building 15 feet, then runs south 50 feet to a manhole. The manhole is drained by another 6 inch line continuing south 80 feet through the drive/ally to the city storm drain. The pipeline lies approximately 5 feet below ground surface. The PCE contamination is within silt and clays below the drain pipe, spreading laterally outward several feet and to depths of 16 to 20 feet. Additional PCE contamination may exist under the 715 Central Avenue building floor slab in the vicinity of the floor drain and drain pipe.

The primary contaminant at the site is PCE. Daughter products of PCE are also present at the site, but in relatively low concentrations. The highest reported TCE concentration of 243ug/l was at well BPGP33B, compared to a PCE concentration of 23,100ug/l. Other than TCE, there were no concentrations of daughter products

above 5ug/l. The gravel composition of the aquifer indicates that it has high hydraulic conductivity and a fast flow rate.

As of June 2006, indoor air samples were collected from thirty six single dwelling residences, one two-family dwelling, one motel (with long-term residents), two apartment buildings, a school, and a commercial office building at 711 Central Avenue. The 711 Central Avenue office building is the closest structure downgradient of the site and had the highest indoor air PCE concentration of 130ug/m³. The highest PCE concentrations at residential properties were 120ug/m³ and 100ug/l. Sub-slab or crawlspace samples were also collected from most of the properties from which indoor air samples were collected. The highest sub-slab PCE concentration was 1,800,000ug/m³ at 711 Central Avenue adjacent to the source area. The highest residential sub-slab sample concentration was 160,000ug/m³. Sub-slab results in the study area to the northwest of the 100ug/l PCE groundwater isopleth indicate some residential structures peripheral to the 100ug/l isopleth are also impacted by vapor intrusion.

4. Release or threatened release into the environment of a hazardous substance or pollutant or contaminant.

PCE and its daughter products, TCE, DCE, and vinyl chloride, are chlorinated ethylenes and are all hazardous substances as defined by 104(14) of CERCLA. Chlorinated ethylenes are dense non-aqueous phase liquids (DNAPLs), which have low solubility and are denser than water. When released into the subsurface, these chemicals can migrate downwards below the groundwater table. In the saturated zone, chlorinated ethylenes may exist in the subsurface environment as a DNAPL in dissolved phase or sorbed phase. Due to the slow dissolution rate of DNAPL, areas in the subsurface containing DNAPL serve as lasting sources of groundwater contamination. The area containing sorbed, residual, and mobile DNAPL is the DNAPL source area. Groundwater flowing through the DNAPL source area becomes contaminated, forming a plume of dissolved-phase contamination downgradient from the source.

PCE contamination released into fine-grained soils below the drain pipe on the east side of 715 Central Avenue created a source area that has resulted in the development of a significant PCE groundwater plume. The PCE contaminated groundwater releases the PCE (a volatile organic chemical) into soil gas where it diffuses upward through pores in the soil. When the soil gas approaches the surface at a location near a building, the contaminated soil gas can be drawn into the building and potentially pose a risk to human health. The concentration in the building will depend on the soil gas concentrations and the rate the soil gas is drawn into the building relative to the natural ventilation rate of the building. Building ventilation rates tend to be higher in the summer, when doors and windows are open, compared to the winter, when the

building openings are kept closed. Thus, indoor VOC concentrations tend to be higher in the winter and lower in the summer.

5. NPL status

The Site is not on the National Priorities List (NPL).

B. Other Actions to Date

1. Previous actions

There have been no previous Removal Actions at this Site.

2. Current Actions

Other than the removal assessment and associated sampling activities discussed in this document there is no current Removal Action at this Site. EPA has requested technical assistance from ATSDR.

C. State & Local Authorities' Role

Montana DEQ has requested EPA assistance at this Site. Neither the State nor local agencies have the resources to conduct the needed site investigation or clean-up independently. EPA has kept State and local agencies apprised of the sampling events and results.

III. Threats to Public Health or Welfare or the Environment

A. Threats to Public Health or Welfare

The conditions at the Site present an imminent and substantial threat to human health and the environment and meet the criteria for initiating a Removal Action under Section 300.415(b)(2) of the NCP. The conditions at the Site have been evaluated against the seven evaluation criteria for initiating a Removal Action under Section 300.415(b)(2) of the NCP. Site conditions meet evaluation criteria ii, iv, and vii and are discussed below.

- (ii) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, or pollutants or contaminants;

The PCE groundwater plume encompasses an urban area southwest of downtown Billings of 140 acres. There are approximately 298 residential, 8 condominium, and 179 commercial properties overlying the plume. Four rounds of sampling for VOCs in and under indoor spaces have been conducted: Summer 2006, Fall 2006, Winter

2006-2007, Spring 2007. These samples were primarily taken within the delineated area of groundwater contamination ($> 100\text{ug/l}$), though a few samples were collected adjacent to the plume. Of the over 400 buildings (including residences and commercial) overlying the plume, approximately 45 (or 10%) have been sampled. Elevated levels of VOCs were found in both sub-slab samples and indoor air samples. Concentrations of PCE in indoor air range from below detection (1ug/m^3) to 170ug/m^3 . Of the residences sampled, approximately 10% (four residences: 620 St. Johns Ave., 632 St. Johns Ave., 311 Howard Ave., and 342 Miles Ave.) have measured indoor air concentrations that exceed EPA's target indoor air concentration of 41ug/m^3 for PCE in residential settings. One commercial building also showed an exceedence of EPA's indoor air target concentration. Sub-slab soil gas concentrations for structures tested within the plume ranged from less than 1ug/m^3 to $1,800,000\text{ug/m}^3$. Approximately 85 percent of sub-slab soil gas concentrations were greater than $1,000\text{ug/m}^3$, 45 percent greater than $10,000\text{ug/m}^3$, and 10 percent greater than $100,000\text{ug/m}^3$.

Many of the residents within the groundwater plume have irrigation wells and use the shallow aquifer water for watering lawns and gardens. Although all residents are reported to be on municipal water and have been warned about drinking the water from the wells by both the Montana DEQ and EPA, an assessment of health risks (Attachment 1), shows, especially for young children, there is the potential for increased health risks due to incidental exposure through recreational use of the groundwater.

(iv) High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate;

PCE migrating from the PCE source area adjacent to 715 Central Avenue has resulted in a downgradient groundwater plume encompassing 140 acres. Unabated, PCE will continue to migrate from the PCE source area, sustaining the groundwater plume for many decades and or centuries. As a result, PCE vapors will continue to diffuse upward through pores in the soil and into overlying structures.

(vii) The availability of other appropriate federal or state mechanisms to respond to the release; No other Local, State, or Federal agency is in the position, or has the resources, to independently implement an effective response action to address the ongoing threats presented at the Site.

B. Threats to the Environment

No specific threats to wildlife and plants have been identified. The primary purpose for conducting the Removal Action is to remove the significant threat to human health posed by the release.

IV. Endangerment Determination

An assessment of health risks at the Billings PCE Site (see Attachment 1) describes three current exposure pathways that are complete and potentially significant: (1) inhalation of indoor air, (2) incidental ingestion, inhalation and dermal exposures while using well water for non-drinking water purposes (e.g. wading pools) and (3) ingestion of produce watered by groundwater. The risk assessment indicates four volatile organic compounds (VOCs) to be above risk-based screening levels and considered to be contaminants of concern. These are PCE, 1,2-dichloroethane, benzene, and chloroform. The risk assessment found 8 indoor air sampling locations to be above the 10^{-4} cancer risk with the remaining properties sampled exceeding a 10^{-5} risk.

In the higher contaminated areas closer to the source area, the risk assessment found a potential cumulative cancer risk of $2.0\text{E-}03$ (using conservative assumptions) and a non-cancer hazard index of 1.55 (for children) if well water is used for recreational purposes. This recreational risk scenario is based on a child immersed in a recently filled pool for 1.5 hours/day for 50 days out of the year, where incidental ingestion of water, inhalation of water vapors, and dermal exposure can occur. Further out in the plume where contaminant concentrations are less, the risk assessment found a cumulative cancer risk of $2.6\text{E-}04$, with a non-cancer hazard index of 0.2 for children under the recreational scenario.

The potential for noncancer health effects is evaluated by comparing the intake of a chemical with the reference dose. The resulting ratio is the Hazard Quotient. When the daily intake of a chemical exceeds the reference dose (i.e., $\text{HQ} > 1$), there is a potential for adverse noncancer health effects to occur. A Hazard Index (HI) is the summation of relevant HQ values and is used to determine if an exposed individual is at risk of developing adverse health effects resulting from simultaneous exposure to all selected chemicals by all complete exposure pathways.

Potential health risk associated with carcinogens is estimated by calculating the increased probability of an individual developing cancer during his or her lifetime as a result of exposure to a carcinogenic compound. EPA has established a target cancer risk range of 10^{-6} to 10^{-4} . This means that an individual who is exposed to the maximum amount of contaminated media reasonably expected has an increased probability of 0.000001 or 0.0001 of coming down with cancer, in addition to the background rate of cancer in the U.S. which is 0.5 for males and 0.3 for females.

The risk assessment found it unlikely that garden produce irrigated with groundwater containing VOCs posed any significant health concerns.

V. EXEMPTION FROM STATUTORY LIMITS

The Removal Action cost ceiling calculated for this Site exceeds \$2 million dollars. In addition, the Removal Action may exceed 12 months. The conditions at this Site meet the criteria set forth in CERCLA Section 104(c)(1)(A) to be exempt from these limits.

A. There is an immediate risk to public health or welfare or the environment.

There is an immediate risk to public health at the Site from vapor intrusion as well as potential risks from recreational use (i.e. playing in or filling baby pools) of groundwater from irrigation wells. Significantly elevated sub-slab gasses exist under most structures (residential and commercial) at the Site. Of the residences sampled over the groundwater plume, 10% have indoor PCE concentrations greater than EPA's target indoor air concentration of $41\mu\text{g}/\text{m}^3$ for PCE in residential settings (10^{-4} incremental increased cancer risk). Although residents have been informed on proper use of irrigation water for watering lawns and gardens (public meeting Oct 4, 2006, and EPA fact sheet distributed week of June 19th), there exists a potential threat to public health from the use of contaminated groundwater wells at the Site.

B. Continued response actions are immediately required to prevent, limit, or mitigate an emergency.

Immediate implementation of source containment, followed by source removal and groundwater remediation is required to address the health risks posed by the existing conditions. If the exemption is not granted and no cleanup takes place, residents within the Billings Groundwater Plume will continue to experience health risks from the vapor intrusion pathway and from incidental exposures from use of irrigation wells.

C. Assistance will not otherwise be provided on a timely basis.

Assistance from other government agencies is not anticipated because neither the State nor the City has the response capabilities to take any actions at the Site. The Montana DEQ requested EPA assistance at this Site. Consequently, the timely completion of this Removal Action can only be accomplished if this combined 12-month and \$2 million exemption request is approved.

VI. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Actions

1. Proposed action description

The objective of a removal action at the Billings PCE site is to address risks to human health from the PCE groundwater plume. The risks posed by the groundwater plume are from two pathways: (1) inhalation of indoor air (vapor intrusion), and (2) incidental ingestion, inhalation and dermal exposures while using or recreating in groundwater from contaminated irrigation wells. The goal of the removal action is to remediate the PCE source area and groundwater plume within a relatively short period of time (3-5 years). Based on analyses of the data from the site, it is estimated that a groundwater concentration of 100ug/l or less will reduce the vapor intrusion threat to an incremental cancer risk of 10^{-6} . This concentration will also be sufficiently protective for the second pathway described above, incidental ingestion and dermal exposures while recreating in the groundwater.

The proposed removal action will consist of several components to remediate groundwater plume concentrations to below 100ug/l within 3-5 years. The first component consists of immediate implementation of source area containment (in the vicinity of 7th Street West) by injection of zero valent iron to provide a treatment and containment zone just below the source area (see Figure 5). This phase will be followed by two additional components: PCE source clean-up; and (3) remediation of the groundwater plume. Groundwater plume remediation will include injection of up to three treatment zones (final locations to be determined by ERT modeling) to accelerate attenuation of the plume. These treatment zones will be established with zero valent iron or bioremediation, depending upon results of ongoing modeling and treatability studies. PCE source clean-up will be conducted through excavation of PCE source in the unsaturated zone and into the saturated zone to the extent field conditions allow. Excavated soils will be hauled to an off-site facility for appropriate disposal. Remaining PCE source in the saturated zone will be treated with in-situ oxidation. A fourth component, soil vacuum extraction, will be evaluated and implemented if necessary to remove any source zone contamination in the unsaturated zone discovered under the 715 and 711 Central Avenue buildings. Venting² of residential structures will be conducted on residential properties where indoor air test data have shown a 10^{-4} cumulative cancer risk attributed to groundwater and where interim mitigation measures taken by the resident have been unsuccessful. During Characterization of the Site will be conducted as necessary to assess source area and groundwater contamination,

² Indoor venting: Sub-slab depressurization systems (basements) and or sub-membrane depressurization systems (crawl space).

indoor air vapor intrusion, and removal action effectiveness. Other technologies may be utilized as appropriate to meet the clean-up objective.

A variety of ancillary activities will be required to initiate and complete the removal action. They include but are not limited to:

- Site preparation, e.g., asphalt removal, traffic control, electricity hook-ups.
- Vapor and odor control during excavation of soils.
- Fencing of the source area during soil removal; and site security during the removal.
- Transportation and off-site disposal of contaminated soils generated, as well as used carbon from any vapor treatment.
- Monitoring sampling of soil and groundwater at various times to assess remediation progress.
- Site restoration, e.g., repairs to streets, buildings, sidewalks, and utilities; and landscaping.
- Installation of building/home ventilation systems

2. Contribution to remedial performance

This Removal Action is intended to address health risks associated with vapor intrusion and recreational use of groundwater at the Site. No additional action is anticipated following implementation of the removal actions described herein.

3. EE/CA

This is a Time-Critical Removal Action; thus, an EE/CA is not required.

4. Applicable or relevant and appropriate requirements

As this Action is being conducted as a time critical removal action, all Federal and State ARARs may not have been identified at this time. The ARARs identified to date are provided as Attachment 2. In accordance with the NCP, all ARARs for the Site will be attained to the extent practicable, given the scope of the project and the urgency of the situation as they are identified.

5. Project Schedule

Sub-slab venting of from 1 to 4 residents will be initiated in the November-December 2007 time frame. Containment of the source area will be conducted as early as February 2007 and completed by April 2007. This will be followed with excavation of source area soils adjacent to 715 Central Avenue and plume remediation in Spring/Summer 2008. The first application of In-situ Chemical

Oxidation of the source area will be conducted in Summer/Fall 2008, with up to three additional follow up applications spaced 4 to 6 months apart thereafter.

B. Estimated Costs

The following cost estimate assumes the following: (1) containment of the source area with zero valent iron treatment zone; (2) the PCE source zone removal: including excavation of up to 2,000 cubic yard in the unsaturated zone and off-site disposal; (3) PCE source zone treatment of the unsaturated zone with in-situ chemical oxidation (ISCO); (4) groundwater plume remediation with two zero valent iron or bioremediation treatment zones; and (5) soil vapor extraction of source areas in the unsaturated zone below the 715 and 711 Central Avenue buildings.

Extramural Costs

ERRS

Source containment, excavation, treatment	\$2,200,000
Groundwater plume remediation	\$750,000
Soil Vapor Extraction	\$210,000

START

Groundwater Monitoring	\$385,000
Indoor Air Sampling/Venting	\$370,000
Field Support, Field Sampling, Data Reports, Project Plans	\$250,000
Subtotal Extramural Costs	\$4,165,000

Contingency (20%)	<u>\$833,000</u>
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TOTAL REMOVAL PROJECT CEILING	\$4,998,000
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The total EPA costs for this removal action based on full-cost accounting practices that will be eligible for cost recovery are estimated at:

Total Removal Ceiling	\$4,998,000
EPA's Direct Intramural Costs	<u>\$ 175,000</u>
Subtotal	\$5,173,000
Regional Indirect Cost (35%)	\$1,810,550
ESTIMATED TOTAL PROJECT COST	\$6,983,550

The total EPA costs for this removal action based on full-cost accounting practices that will be eligible for cost recovery are estimated to be \$6,983,550. Direct costs include direct extramural costs and direct intramural costs. Indirect costs are calculated based on an estimated indirect cost rate expressed as a percentage of site-specific direct costs, consistent with the full cost accounting methodology effective October 2, 2000. These estimates do not include pre-judgment interest, do not take into account other enforcement costs, including Department of Justice costs, and may be adjusted during the course of a removal action. The estimates are for illustrative purposes only and their use is not intended to create any rights for responsible parties. Neither the lack of a total cost estimate nor deviation of actual total costs from this estimate will affect the United States right to cost recovery.

VI. Expected Change in Situation if Action Delayed or Not Taken

Delayed action will increase public health risks posed by PCE and daughter products in groundwater.

VII. Outstanding Policy Issues

This removal does not set a precedent; vapor intrusion has been dealt with under the removal program before. The issue of vapor intrusion is, however, a nationally significant issue.

VIII. Enforcement

A potentially responsible party may be identified at this Site. Attachment 3 is a confidential Enforcement Addendum which sets forth EPA's enforcement strategy for this Site.

IX. Recommendation

This decision document represents the selected Removal Action for the Billings PCE in Billing, Montana, developed in accordance with CERCLA as amended, and not inconsistent with the NCP. This decision is based on the Administrative Record for the Site.

Conditions at the Site meet the NCP Section 300.415(b)(2) criteria for a Removal, and I recommend your approval of the proposed Removal Action. The total project ceiling will be \$4,998,000, of this amount, an estimated \$4,998,000 will come from the Regional removal allowance.

Approve: David A. Ostrander Date: 10/12/07
David A. Ostrander, Program Director
Preparedness, Assessment and Emergency Response

Disapprove: _____ Date: _____
David A. Ostrander, Director
Preparedness, Assessment and Emergency Response

Attachments:

Attachment 1-Risk Assessment
Attachment 2-Applicable or Relevant and Appropriate Requirements
Attachment 3-Confidential Enforcement Addendum

Figure 1-Site Location Map
Figure 2-PCE Groundwater Plume Map
Figure 3-PCE Source Area
Figure 4-Sub-slab/Indoor Air test locations/results
Figure 5-Removal Action components

Table 1-Sub-slab/Indoor Air test results

SUPPLEMENTAL DOCUMENTS

Support/reference documents which may be helpful to the reader and/or have been cited in the report may be found in the Administrative Record Files for the Billings PCE Site at the Superfund Records Center for Region VIII EPA, 1595 Wynkoop Street, Denver, Colorado 80202-1129. An additional copy of the Administrative Record File will be placed at a repository near the Site, the location of which is to be determined.